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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,399	03/25/2005	Luc Brohan	032013-064	3495
21839 7590 10/05/2007 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404				
			EXAMINER ZIMMER, ANTHONY J	
			ART UNIT 1709	PAPER NUMBER
			NOTIFICATION DATE 10/05/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	Application No. 10/502,399	Applicant(s) BROHAN ET AL.	
	Examiner Anthony J. Zimmer	Art Unit 1709	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 25 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/26/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

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## **DETAILED ACTION**

### ***Application Status***

1. Claims 1-15 are pending and are subject to examination.

### ***Priority***

2. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. FR 02 01055, filed on 29 January 2002.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 26 July 2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Objections***

4. Claim 1 is objected to because of the following informalities: In the tenth line of the claim the word "octahedral" does not make sense. A suggested correction would be "octahedra" or "octahedrals". There is an unneeded "h" after the word "which." Appropriate correction is required.

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5. Claims 4, 5, and 10 are objected to because of the following informalities: There is a typo. Hydrochloric acid is spelled "HC1". Appropriate correction is required.

6. Claims 5, 10, and 11 are objected to because of the following informalities: There is a type. "TiOCl<sub>2</sub>" is spelled "TiOC1<sub>2</sub>". Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claims 1-3, 9, and 15 recite the limitation "it". There is insufficient antecedent basis for this limitation in the claim.

10. In line 10 and 14 of claim 1 it is unclear to what the dimensions "(2 x 2.92 Å)" and "(2 x 3.21 Å)" are referring, and if they are a limitation of the claim or optional as they are in parentheses. One of ordinary skill in the art would not be reasonably apprised of the scope of the claim and the claim is rendered indefinite. Dependent claims 2-14 are rendered indefinite as a result.

11. Regarding claim 1, the phrase "may be" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

12. In further regard to claim 1, the claim cites the polymer having "a structure of one-dimensional (1D) character." This phrase make the claim unclear as later it is mentioned that fibers of the polymer are made up of (three dimensional) octahedrals, which are made up of the polymer. It is unclear what "one-dimensional character" means and how a polymer of one-dimension can make up a fiber with three-dimensional subunits. Also, it is well known that polymers and molecules in general at least have a two-dimensional structure. As a result of the use of this phrase, the claim and the dependent claims thereof are rendered indefinite as a person of ordinary skill would not reasonable be apprised of the scope of the claim(s).

13. Claim 14 recites the limitations "the titanium of the polymer in  $Ti^{3+}$  form" and "the titanium of the polymer in  $Ti^{4+}$  form". There are insufficient antecedent bases for these limitations in the claim.

14. The recitation of using a composition "according to the invention" in claim 15 renders the claim indefinite. It is unclear to which composition this claim is referring. One of ordinary skill in the art would not be reasonably apprised of the scope of the

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invention, and claim 15 is rendered indefinite as a result. For the purpose of examination, the examiner will interpret the phrase as meaning the composition of claim 1.

Therefore, claims 1-15 are rejected under 35 U.S.C. 112, second paragraph.

***Claim Rejections - 35 USC § 102/103***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1-2 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hideyuki (JP 57190645, hereafter referred to as R1).

In regard to claim 1, R1 teaches a process of forming gels, in particular of forming a  $\text{TiO}(\text{OH})_2$  (titanium oxide based) gel where the  $\text{TiO}(\text{OH})_2$  exists in fibers, see abstract of R1. R1 is silent about the makeup and structural properties of the fibers as required by claim 1, however one of ordinary skill in the art at the

time of the invention would have recognized these properties as inherent. Since the compound of R1 has the same formula as that of the instant claim, and since the compound of R1 exists in the same form as that of the instant claim (as fibers making up a gel), the structural properties of the substance in R1 would necessarily be the same as those recited in limitations of claim 1.

To be more specific the distance between concentrically wound fibers, the periodicity of the fibers, and the makeup of each fiber (octahedral) are only dependent upon the compound making up the fiber; and the method of connecting the molecules (edge-sharing) and the method of connecting chains of the molecules are dependent only upon the specific compound. Since the compound of R1 is the same as that of the instant claim and is in the same form as that of claim 1 (fibers making up a gel), the limitations as recited in claim 1—i.e. the distance between concentrically wound fibers, the periodicity of the fibers, the makeup of each fiber (octahedral), the method of connecting the molecules (edge-sharing), and the method of connecting chains of the molecules—would necessarily be inherent in R1.

In regard to claim 2, the compound in R1 according to its molecular formula contains titanium in the oxidation state 4+. Since the polymer composition of the instant claim is the same as that of R1, and since properties such as translucence are dependent upon the substance, it is inherent that the compound of R1 would necessarily be translucent.

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Therefore, claims 1-2 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hideyuki (JP 57190645). In the alternative, R1 fails to mention the characteristics of the fiber and the periodicity of the fibers. However, one of ordinary skill in the art would have been motivated to produce the properties recited in claims 1-3 in order to produce a form of titanium oxide that is easy to use industrially (i.e. using the fibers in the industrially applicable gel or sol), i.e. in exploiting the known light absorption/shielding capabilities of titanium oxide compounds, see evidentiary document US5403513 column 7 lines 57-62.

***Claim Rejections - 35 USC § 103***

18. The text of those sections of Title 35, U.S. Code is included in this action in the above 102/103 rejection.

19. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over R1.



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R1 teaches the limitations of claim 1, see 102/103 rejection above. R1 fails to teach titanium in a +3 oxidation state. However, it is well known that titanium exists in many different oxidation states and that the titanium compounds change oxidation states upon exposure to UV light. Thus one of ordinary skill in the art would have found it obvious that at least some of the titanium R1 would be in the +3 oxidation state from exposure to ordinary daylight. Titanium in the +3 oxidation state is well known to provide color (especially green), see evidentiary document US4367280 column 17 lines 13-15, and since the compound of R1 contains titanium in the +3 oxidation state, the compound would necessarily have a coloration (especially green).

Therefore, claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over R1.

21. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graetzel et al. (US5350644, hereafter R2) in view of R1.

R2 teaches a photovoltaic cell in which the anode (photoanode) and the cathode (photocathode) comprise a conductive glass plate covered with a doped titanium dioxide compound, wherein the anode and the cathode are separated by an electrolyte; see figure 1 of R2. It is well known in the art to use in an electrochemical device an anode with a metal or metal oxide with the metal in a

lower oxidation state than the metal in the cathode. R2 fails to teach using the compound of claim 1 of the instant application to coat the glass plate. Titanium dioxide is recognized in the prior art to have a wide band gap and therefore the titanium dioxide does not absorb light in the visible spectrum; see R2 column 1 lines 11-15. Therefore it would have been obvious to one of ordinary skill in the art to try other known titanium oxide compounds like that of R1 in this regard, as a person of ordinary skill has good reason to pursue options within his or her grasp. Since other titanium compounds like the doped compound of R2 are found to have at least moderate success, one of ordinary skill in the art could pursue the known options (i.e. the compound of R1) with a reasonable expectation of success. Since the compound of R1 is known in +3 and +4 oxidation states, and since it is known to use an anode with a metal or metal oxide with the metal in a lower oxidation state than the metal in the cathode (this is how many batteries are made), it would have been obvious to one of ordinary skill in the art to use the compound of R1 in the +3 form in the anode and the +4 form in the cathode.

Therefore, claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over R2 in view of R1.

22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US5403513, hereafter R3) in view of Hideyuki (JP 57190645, hereafter referred to as R1).

R1 teaches the composition of claim 1, see 102/103 rejection above.

In regard to claim 15, R1 fails to teach applying the titanium oxide based gel as a layer on a glass plate.

However, R3 teaches using a titanium oxide sol (gel) as a surface coating (a layer) on glass, see R3 column 7 lines 57-62. One of ordinary skill in the art would have been motivated to modify R1 in view of R3 as titanium oxide gels or sols are excellent in binding to a base (like glass), have a high refractive index, are excellent in transparency, and are excellent in ultraviolet shielding effect, see R3 column 7 lines 57-62.

Therefore claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyuki (JP 57190645) in view of Sato et al. (US5403513).

### ***Allowable Subject Matter***

23. Claims 4-13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

24. In sum, all claims are rejected and no claim is allowed.

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25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wang et al. is included, as it shows the particular bonding structure of rutile titanium structures (like that of the instant invention and that of R1).

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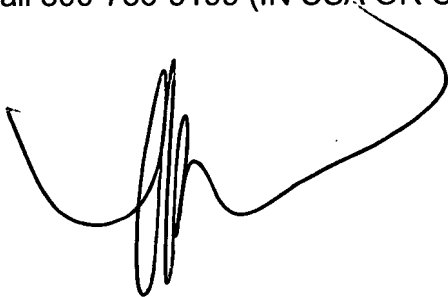
**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Zimmer whose telephone number is 571-270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz



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SUPERVISORY PATENT EXAMINER